



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>A61B 17/22</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/54672</b> <b>(43) International Publication Date:</b> 21 September 2000 (21.09.00)
<b>(21) International Application Number:</b> PCT/GE99/00003 <b>(22) International Filing Date:</b> 14 April 1999 (14.04.99) <b>(30) Priority Data:</b> 003427 18 March 1999 (18.03.99) GE <b>(71)(72) Applicant and Inventor:</b> KVARATSKHELIA, Grigoli [GE/GE]; Ambrolauris Street, 166-30-8, 380071 Tbilisi (GE).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>With amended claims and statement.</i>
<b>(54) Title:</b> DEVICE FOR EXTRACTION OF STONES FROM KIDNEYS AND URETER  <b>(57) Abstract</b> <p>A device for extraction of stones from urinary tracts comprises an elastic pipe with an inflatable dome-form head, the inner surface of which is completely and the outer surface partially corrugated symmetrically. A pressure supply channel (3) made in the pipe (1) wall is connected with the head (2). Besides the device is provided with a transparent pipe (5) having a longitudinal partition. One part (6) of said pipe is connected with the pressure supply channel (3), and the other part (7), which has an inlet branch-pipe with a clamp (8) for preserving the pressure in the system, is connected with a pipe hollowness (10). The device can be used in medicine, urology.</p> <div data-bbox="1006 1134 1364 1911"> </div>		

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## DEVICE FOR EXTRACTION OF STONES FROM KIDNEYS AND URETER

Present invention refers to medical equipment and concerns the device for  
5 extraction of stones from urinary tracts.

There is known an extractor (1) of stones from ureter, which comprises two  
outer and inner tubes. The inner tube has an inflatable funnel-form head, to which a  
pressure supply pipe-line is connected separately, the outer tube is fixed movable.

The deficiency of the mentioned device is, that at stone extraction the walls  
10 of the ureter can be damaged, besides it cannot be used for extraction of the stone,  
the dimensions of which are significantly larger than the ureter diameter, stuck in  
the kidney pelvis.

The technical result of the invention is in increase of device operation  
efficiency and widening of functional capabilities.

15 The essence of the invention is in, that a device comprises an elastic  
inflatable head of a dome form, the inner surface of which completely, and the  
outer surface partially is corrugated symmetrically. A pressure supply channel made  
in the pipe wall is connected with the head. Besides, the device is provided with a  
transparent pipe having a longitudinal partition. One part of said pipe is connected  
20 with the pressure supply channel, and the other part, which has an inlet branch-pipe  
having a clamp preserving the pressure in the system, is connected with a pipe  
hollowness.

The dome-form of the head provides for protection of ureter wall from  
damage and simplifies the introduction of pipe in the ureter. The corrugation of the  
25 head inner surface enables to fix reliably the stone of any form, and the partial  
symmetric corrugation of the outer surface - to expand the head more.

The pressure supply channel made in the pipe wall simplifies the device  
construction, and the transparent pipe having the inlet branch-pipe widens the  
functional capabilities.

The invention description is explained by means of drawings, where on the fig. 1 is shown the initial position in the ureter of the device for extraction of stones from the urinary tracts; fig. 2 - the same in the ureter being in the operation mode; fig. 3 - the same in the operation mode at extraction of large size stone from kidney  
5 pelvis.

A device for extraction of stones from urinary tracts comprises an elastic pipe 1 with inflatable dome-form head 2, the inner surface of which completely, and the outer surface partially is corrugated symmetrically. In the pipe 1 wall is made a pressure supply channel 3, which is connected with the head 2. Besides, the  
10 device is provided with a transparent pipe 5 having a longitudinal partition 4, one part 6 of the pipe 5 with one side is connected with a pressure supply channel 3, and with the other - with a pressure source (not shown on the figures), and the other part 7, which has an inlet branch-pipe 9 provided with a clamp 8 preserving the pressure in the system, with one side is connected with a pipe hollown  ss 10, with the other -  
15 with a suction ( not shown on the figures).

The device works in the following way (fig. 2): a cystoscope (not shown) is introduced in urinary bladder, in a pipe of the cystoscope the elastic pipe 1 of the device is led. By means of the cystoscope the pipe 1 is introduced in the ureter, after that under the control of echoscope the head 2 is led to the stone. From the pressure  
20 source (not shown on the figures) by means of the pressure supply channel 3 the head 2 is inflated up to the suitable level. In the case of the stone stuck in the ureter, after inflating of the head 2 the stone is freed from the ureter walls and is disposed in the depression created after the head is inflated, where after switching on of the suction (not shown on the figures) it is fixed tightly. Further the pipe 1 is withdrawn  
25 along with the stone. In the case of the stone, the dimensions of which are much larger than the ureter diameter, stuck in the kidney pelvis (fig. 3) after supplying of the head 2 to the stone, inflation, switching on the suction and reliable fixation of the stone, conducted similarly to the above mentioned, in the branch-pipe 9 is introduced a drill (not shown) and by passing the pipe hollown  ss 10 it is led to the  
30 stone and drilling starts. At appearing of urine in the transparent pipe 5, indicating

that the stone has been drilled completely, the drill is taken out and again by means of the branch-pipe 9 a lithotripter (not shown) is introduced, by means of which the stone is crushed in small fragments. Then the lithotripter is withdrawn and each small fragment is extracted separately similarly to the above mentioned.

5           Thus, the proposed device provides for safe extraction of stones from ureter, and in the case of large size stone enables to effect it in the fixed position, that prevents a number of complications.

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## C L A I M S

A device for extraction of stones from urinary tracts, which comprises an elastic pipe with an inflatable head, to which a pressure supply pipe-line is  
5 connected, wherein it is additionally provided with a transparent pipe having a longitudinal partition, one part of said pipe is connected with the pressure supply pipe-line, and the other part, which has an inlet branch-pipe with a clamp for preserving the pressure in the system, is connected with a pipe hollowness, whereas  
10 the head is of a dome form, the inner surface of which is completely and the outer surface partially is corrugated symmetrically, besides the pressure supply pipe-line is made as channel in the pipe wall.

**AMENDED CLAIMS**

[received by the International Bureau on 23 December 1998 (23.12.98);  
original claim 1 replaced by new claims 1 -7 (1 page)]

1. A device for extraction of stones from a kidney cavity and urinary tracts comprising an elastic pipe with an inflatable head connected with a pressure supplying canal wherein it is additionally provided with a transparent pipe having a longitudinal partition. one part of which is connected with a pressure supplying line, and the other part, containing an inlet branch pipe provided with a clamp maintaining the pressure in the system, is connected with a pipe space below the head by means of the wires fixed in the pipe wall with one end and passing freely thereof, the other end of said wires is connected with control levers disposed on the outer surface of said transparent pipe. whereas the head is dome-shaped, and the outer surface is partially corrugated, the pressure supplying line is made as a canal in the pipe wall.

2. The device of claim 1 wherein one of said transparent pipe containing said branch pipe by means of the second end is connected with a negative pressure source, and the other part - with a positive pressure source.

3. The device of claims 1-2 wherein each wire has an additional control lever.

4. The device of claims 1-3 wherein the pipe wall in the wires fixation section is made of more elastic material.

5. The device of claims 1-4 wherein the wires quantity is three.

6. The device of claim 5 wherein the wires fixing points in said pipe wall are disposed under  $120^\circ$  in respect to one another.

7. The device of claim 6 wherein the outer surface of the head is symmetrically corrugated.

**STATEMENT UNDER ARTICLE 19(1)**

Originally there was 1 claim and after amendment of the claim there are 7 claims.

The claim 1 was changed; new claims 2-7 added.



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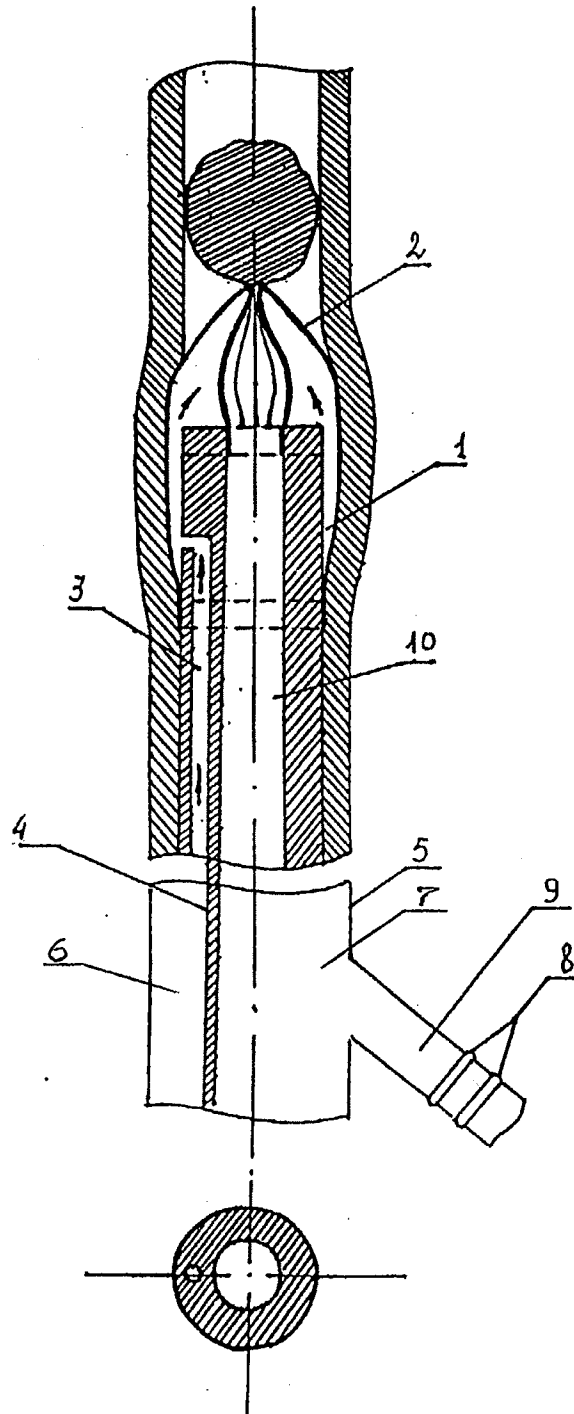


FIG. 1

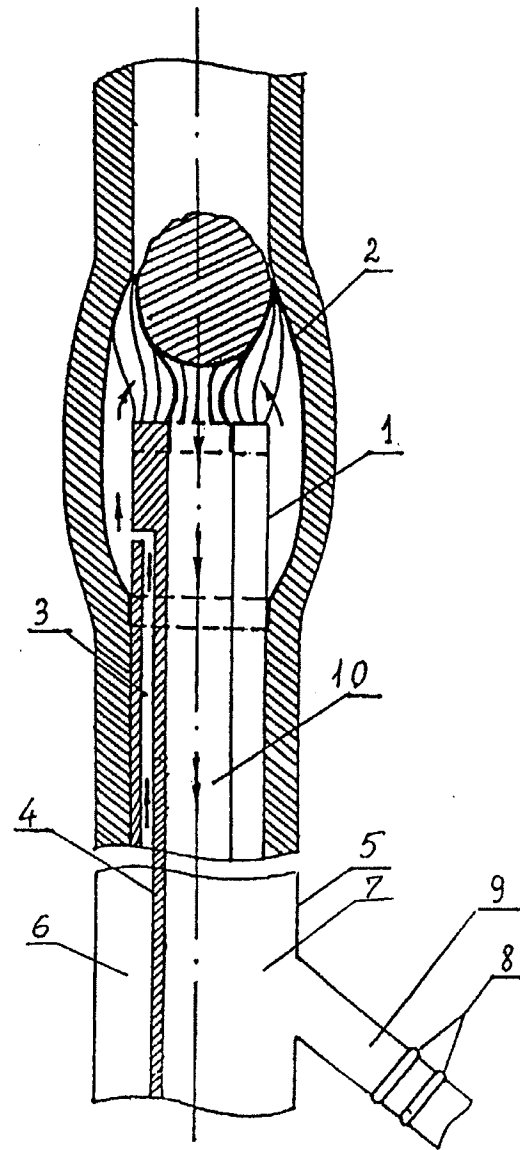


FIG. 2

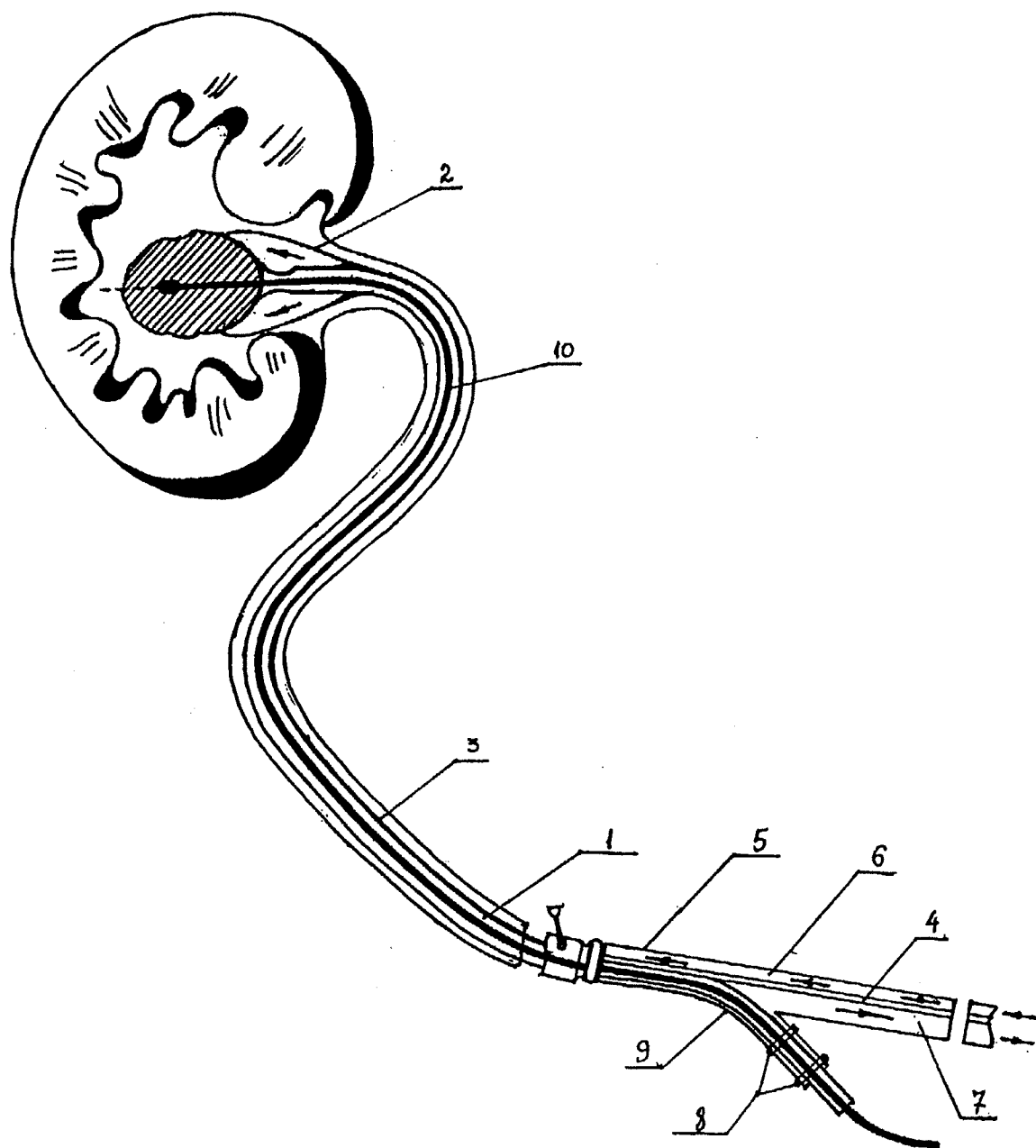


FIG.3

# INTERNATIONAL SEARCH REPORT

International Application No

PC1/GE 99/00003

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61B17/22

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AT 352 253 B (KRAFT-KINZ) 10 September 1979 (1979-09-10) the whole document	1
A	US 4 469 100 A (HARDWICK) 4 September 1984 (1984-09-04) column 4, line 18-49; figures	1
A	DE 21 04 673 A (VEB KOMBINAT MEDIZIN- UND LABORTECHNIK) 31 May 1972 (1972-05-31) claims; figures	1
A	US 4 243 040 A (BEECHER) 6 January 1981 (1981-01-06) abstract; figures	1
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☒ Further documents are listed in the continuation of box C.

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Date of the actual completion of the international search

5 October 1999

Date of mailing of the international search report

13/10/1999

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# INTERNATIONAL SEARCH REPORT

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 3 827 437 A (INABA)          6 August 1974 (1974-08-06)          abstract; figures          column 2, line 25-35          -----</p>	

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/GE 99/00003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
AT 352253 B	10-09-1979	AT 122678 A	15-02-1979
US 4469100 A	04-09-1984	NONE	
DE 2104673 A	31-05-1972	NONE	
US 4243040 A	06-01-1981	NONE	
US 3827437 A	06-08-1974	NONE	